Instructions:

1. A file must be made for the project work assigned with the name, class and academic session neatly mentioned on the project file which can be covered by the brown paper.
2. Any downloaded material from the net should not be pasted directly in the form of a Xerox.
3. The project should be handwritten only.
4. Last date of submission of project is 09 July, 2019.
5. The homework must be original and the proper references should be made in accordance with the task. Neat, creative and honest presentation would be highly appreciated.

English

Integrate your ideas with academics! The summer assignment in English will help you to enhance your preparations for the Board exams. Use 5 A4 sheets and prepare a Book review on any one of the following book :
(unabridged edition) *UP From slavery by Booker T. Washington OR Great Expectations by Charles Dickens ,* use the following guidelines for the Book review and make sure to write it neatly on 5-6 A4 size sheets. - Theme / Analysis - Important features of the characters - Interesting and important quotations.

BIOLOGY:

Make an investigatory project on any one topic from the following-

a) Study on Gene Therapy

b) The effect of Oil Spills on Oceans

c) Pollination in Flowering Plants.

MATHEMATICS:

Do the solution of the following questions in your class note book

1. If A and B are two sets such that n(A) = 37,n(B) = 26 and n(AUB) = 51,find n(A∩B).

2. If A and B are two sets such that n(A) = 24, n(B) = 22, n(A∩ B) = 8,find (i) n(AU B) (ii) n(A-B) (iii)n(B-A)

3. In a committee of 30 members, 50 people speak Hindi, 20 speak English and 10 speak both Hindi and English. How many speak at least one of these two?

4. In a group of 50 students, 30 like tea, 25like coffee and 16 like both. How many like (i) Either tea or coffee (ii) Neither tea nor coffee

5. In a group of 40 students, 26 take samosa,8 take burger and 8 take neither of the two. 3 How many take both samosa and burger? Is taking samosa and burger good for health?

6. There are 2000 students in a school. Out of these 1000 play cricket, 600 play basketball and 550 play football, 120 play cricket and basketball, 80 play basketball and football and 150 play cricket and football and 45 play all the three games. How many students play none of the games?

7. A survey shows that 76% of the Indians like oranges whereas 62% like bananas. What percentage of the Indians like both oranges and bananas?

8. In a survey of 700 students in a college, 180 were listed as drinking Limca, 275 as drinking Miranda and 95 were listed drinking both Limca as well as Miranda. Find how many students were drinking neither Limca nor Miranda.

9. Out of 500 car owners investigated, 400 owned Maruti car and 200 owned Hyundai car and 50 owned both the cars. Is this data sufficient?
Prove by principle of mathematical induction that for all n∈ N, n^2 + n is even natural number.
ACTIVITY: To find the number of subsets of a given set and verify that if a set has n number of elements, then the total number of subsets is 2^n.

Computer Science

Write the following Python program in the Practical File

1. Write a program that accepts radius of a circle and prints its area.

2. Write a program to read a number n and print n^2,n^3,n^4

3. Write a program to find area of a triangle.

4. Write a program to compute simple interest and compound interest

5. Write a program to input a single digit(n) and print a 3 digit number created as
    <n(n+1)(n+2)> e.g. if you input 7, then it should print 789. Assume that the input
    digit is in range 1-7.
6. Write a program to take year as input and check if it is a leap year or not.
7. Write a program that reads a number of seconds and prints it in form: mins and
    seconds E.g. 200 seconds are printed as 3 mins and 20 seconds.
8. Write a program to take a 2 digit number and then print the reversed number.
    That is, If he input given is 25, the program should print 52.

Physical Education

1. Project File – Swimming:-
                        History, Dimensions of pool, Techniques & skills, Rules,
                        Olympic Records and world records of previous events and Waist
                        hip ratio.
                        –   BMI Chart of 9 students

PHYSICS

1. A bullet fired at an angle of 30° with the horizontal hits the ground 3 km away. By
    adjusting its angle of projection, can one hope to hit a target 5 km away? Assume the
    muzzle speed to be fixed, and neglect air resistance.
2. A shot is fired at an angle of 30° with horizontal from the top of a tower 182.88 m high.
    The velocity of projection is 60.96 m/s. Find where from the foot of tower it strikes the
    ground?
3. The ceiling of a long hall is 25 m high. What is the maximum horizontal distance that a
    ball thrown with a speed of 40 ms^{-1} can go without hitting the ceiling of the hall?   [Ans.
    150.5 m]
4. A ball is thrown upwards with a velocity of 80 m/s at an angle of 30° to the horizontal.
    Find its velocity after one second.   [Ans. 75.57
    m/s, 23°33′]
5. A shot is fired at a distance of 39.2 m from the foot of a pole 19.6 m high so that it just
    passes over it. Find the magnitude and direction of the velocity of the shot.   [Ans.
    27.72 m/s, 45°]

6. A batsman hits a pitched cricket ball at a height of 1.2 m above the ground so that its angle of projection is 45° and its horizontal range is 110 m. The ball is lifted towards the left field line, where a fence of 7.5 m is located 100 m from the position of the batter. Will the ball clear the fence?

7. A very broad elevator is going up vertically with a constant acceleration 1 m s^{-2}. At the instant when the velocity of the lift is 2 ms^{-1}, a stone is projected from the floor of the lift with a speed of 2 ms^{-1} relative to the floor at an elevation 30°. Find (i) the time taken by the stone to return to the floor (ii) the range of the stone over the floor of the lift.
[Ans. (i) 0.1818 sec, (ii) 0.3149 m]

8. A rifle was aimed at the vertical line on the target located precisely in the northern direction, and then fired. Assuming the air drag to be negligible, find how much off the line and in what direction will the bullet hit the target. The shot was fired in the horizontal direction at the latitude of 60°. The bullet velocity is 900 m/sec and the distance from the target equals 1 km.

9. Find the angle of projection at which the horizontal range and maximum height of a projectile are equal.
[Ans. 76°]

10. A projectile is fired from a point O with velocity the same, as it would be due to a fall of 100 m from rest. The projectile hits a mark at a depth 50 m below O and a distance of 100 m from vertical through O. Show that the two possible directions of projection are at right angles.

11. A body is thrown horizontally from the top of a tower and strikes the ground in 3 seconds at an angle of 45° with the horizontal. Find the height of the tower and the speed with which it was projected.
[Ans. 44.1 m, 29.4 m/s]

12. A student writes the Einstein's mass-energy equivalence relation as $E = c^2/m$, where m is mass and c is the speed of light in free space. Is the relation correct? If not, establish the correct relation.

13. The speed of sound v in a medium depends on the modulus of volume elasticity E and density ρ of the medium. Obtain formula for the speed of sound by dimensional analysis.

14. Assuming that the mass m of the largest stone that can be moved by a flowing river depends upon the velocity v of water, its density ρ and acceleration due to gravity g. Show that m varies as the sixth power of the velocity of water in the river.

15. The air bubble formed by explosion under water performs oscillations with time-period T which depends upon the static pressure P, water density d and the energy of explosion E. Establish formula for the period T by dimensional analysis.

16. The critical velocity v_c of a liquid flowing through a tube depends upon the coefficient of viscosity η of the liquid, density ρ of the liquid and radius r of the tube. Use the method of dimensions to obtain the formula for v_c .

17. Derive dimensionally the relation $s = ut + \frac{1}{2}at^2$, where s is the distance moved by a particle in tune t when the particle has an initial velocity u and an acceleration a .

18. Assuming force (F), length (L) and time (T) to be the fundamental units, find out the dimensions of mass. If energy (E) is considered in place of (F), then what will be the dimensions of mass?

19. Work out the dimensions of linear momentum p and surface tensions S in terms of velocity (v), density (ρ) and frequency (v) as fundamental units.

20. Four students write the following four different formulae for the displacement y of a particle undergoing a certain periodic motion of time-period T :

(i) $y = a \sin(\omega + /T)$ (ii) $y = a \sin(v \, t)$

(iii) $y = \frac{a}{T} \sin(t/a)$ (iv) $y = \frac{a}{\sqrt{2}} (\sin(2\pi \, t/T) + \cos(2\pi \, t/T)),$

where a is the maximum displacement of the particle and v is the speed of the particle at time t . Rule out the wrong formulae on dimensional grounds.

21. Given $Z = \dfrac{A^4 B^{1/3}}{C D^{3/2}}$ where A , B , C and D are measured quantities with percentage errors . What is the maximum fractional error in Z?

22. Which of the following length measurements is maximum accurate and why?

$$5.00 \text{ cm}, \quad 0.005 \text{ mm}, \quad 50.00 \text{ cm}.$$

23. The error in the measurement of diameter of a sphere is 1 %. What will be the percentage error in its calculated volume?

24. The mass of a cube is uncertain by 2% and the length of its edge is uncertain by 1%. What will be the maximum percentage error in its calculated density?

25. Which of the following is the most precise device for measuring length :
(a) a vernier calipers with 20 divisions on the sliding scale,
(b) a screw gauge of pitch 1 mm and 100 divisions on the circular scale,
(c) An optical instrument that can measure length to within a wavelength of light?

26. You are given a thread and a meter scale. How will you estimate the diameter of the thread?